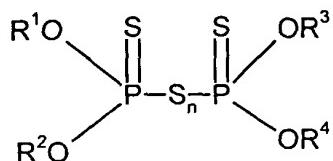


**WHAT IS CLAIMED IS:**

1. A process for the production of dithiophosphoric acid polysulfide mixtures of the formula



5

in which

R<sup>1</sup> to R<sup>4</sup> are identical or different and denote a linear or branched C<sub>1</sub>-C<sub>18</sub> alkyl residue, C<sub>1</sub>-C<sub>18</sub> alkenyl residue, C<sub>5</sub>-C<sub>28</sub> cycloalkyl residue, C<sub>5</sub>-C<sub>28</sub> cycloalkenyl residue as well as a C<sub>6</sub>-C<sub>28</sub> aryl residue or C<sub>7</sub>-C<sub>28</sub> aralkyl residue

10

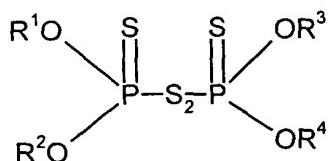
and

15

n denotes a number from 2.5 to 3.5,

20

comprising the step of reacting dithiophosphoric acid disulfides of the formula



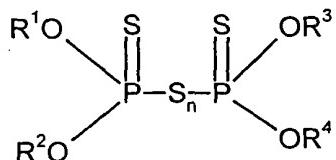
in which

25

R<sup>1</sup> to R<sup>4</sup> have the above-stated meaning,

with 0.5 to 1.5 mol of sulfur, optionally in the presence of a solvent, at temperatures of 100 to 140°C.

2. A sulfur donor for the vulcanization of natural and synthetic rubber comprising dithiophosphoric acid polysulfide mixtures of the formula



in which

10

$R^1$  to  $R^4$  are identical or different and denote a linear or branched  $C_1$ - $C_{18}$  alkyl residue,  $C_1$ - $C_{18}$  alkenyl residue,  $C_5$ - $C_{28}$  cycloalkyl residue,  $C_5$ - $C_{28}$  cycloalkenyl residue as well as a  $C_6$ - $C_{28}$  aryl residue or  $C_7$ - $C_{28}$  aralkyl residue.

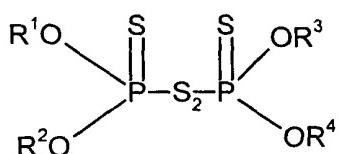
15

and

$n$  denotes a number from 2.5 to 3.5.

20

wherein said dithiophosphoric acid polysulfide mixture is produced by reacting dithiophosphoric acid disulfides of the formula



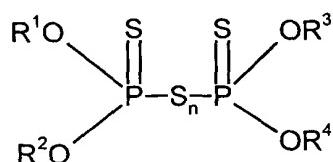
in which

25

$R^1$  to  $R^4$  have the above-stated meaning.

with 0.5 to 1.5 mol of sulfur, optionally in the presence of a solvent, at temperatures of 100 to 140°C.

3. A sulfur donors for the latex vulcanization of natural and synthetic rubber  
5 latex comprising dithiophosphoric acid polysulfide mixtures of the formula



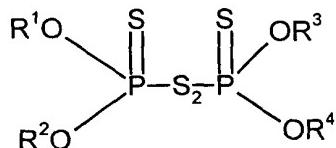
in which

10  $\text{R}^1$  to  $\text{R}^4$  are identical or different and denote a linear or branched C<sub>1</sub>-C<sub>18</sub> alkyl residue, C<sub>1</sub>-C<sub>18</sub> alkenyl residue, C<sub>5</sub>-C<sub>28</sub> cycloalkyl residue, C<sub>5</sub>-C<sub>28</sub> cycloalkenyl residue as well as a C<sub>6</sub>-C<sub>28</sub> aryl residue or C<sub>7</sub>-C<sub>28</sub> aralkyl residue

15 and

n denotes a number from 2.5 to 3.5,

20 wherein said dithiophosphoric acid polysulfide mixture is produced by reacting dithiophosphoric acid disulfides of the formula



in which

25  $\text{R}^1$  to  $\text{R}^4$  have the above-stated meaning,

with 0.5 to 1.5 mol of sulfur, optionally in the presence of a solvent, at temperatures of 100 to 140°C.

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